Water Quality Issues
Legislative Task Force

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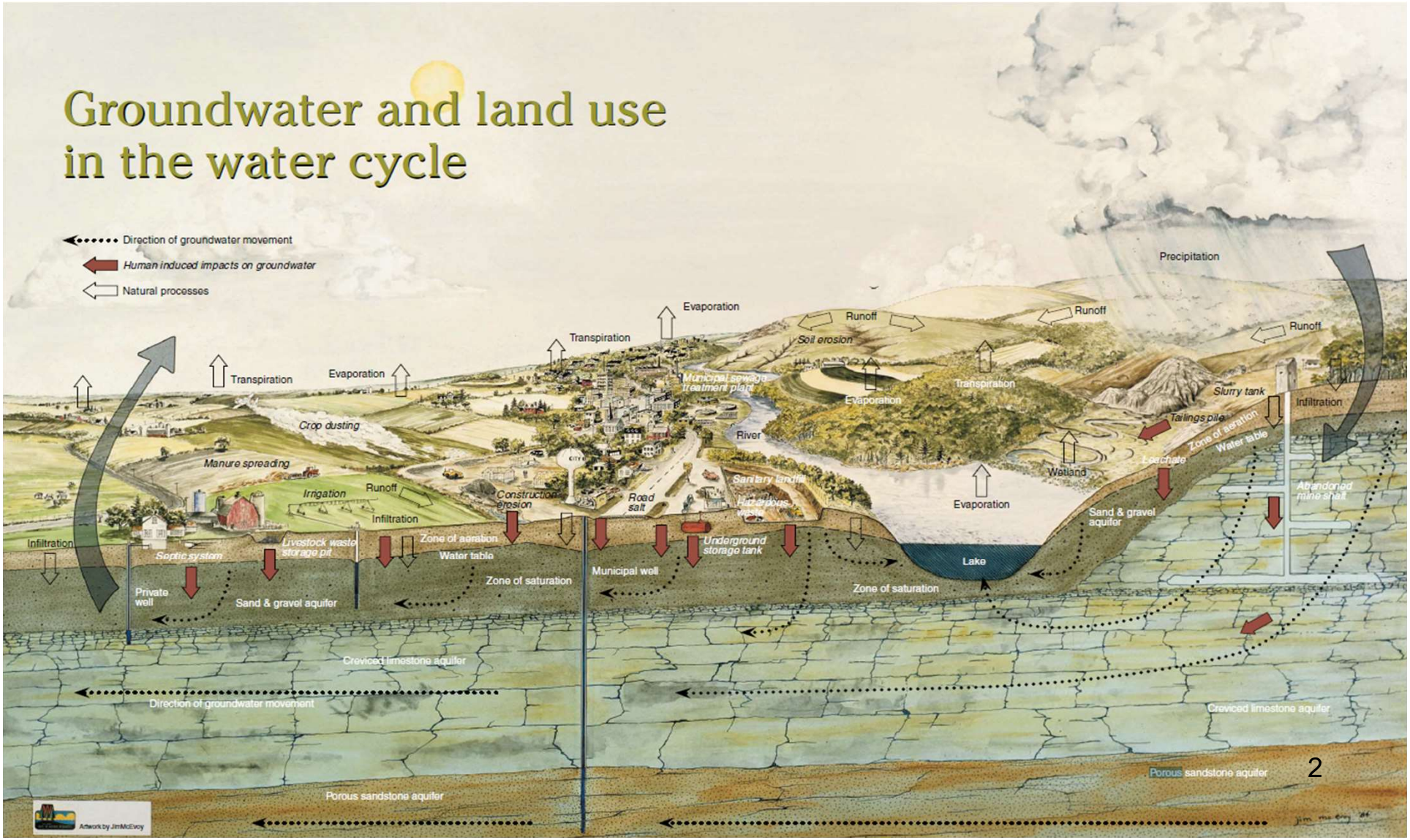
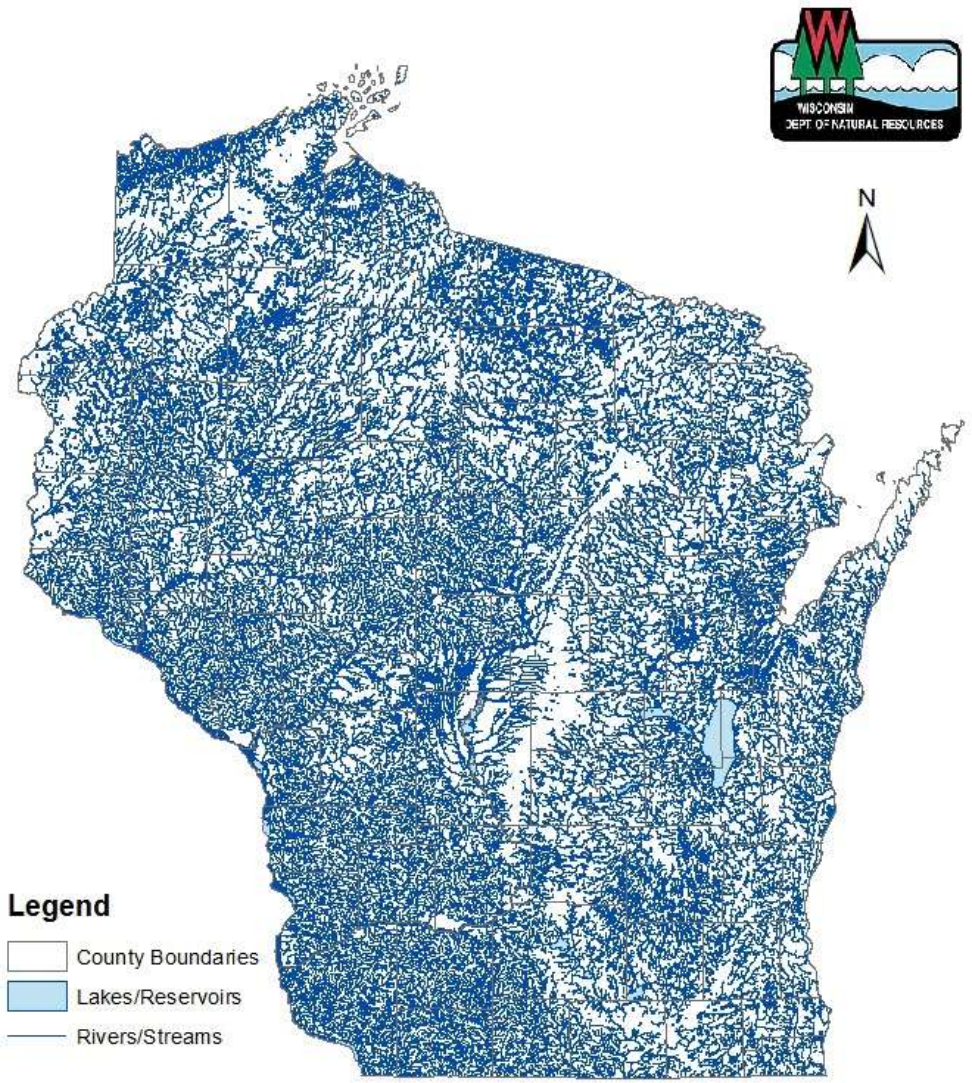
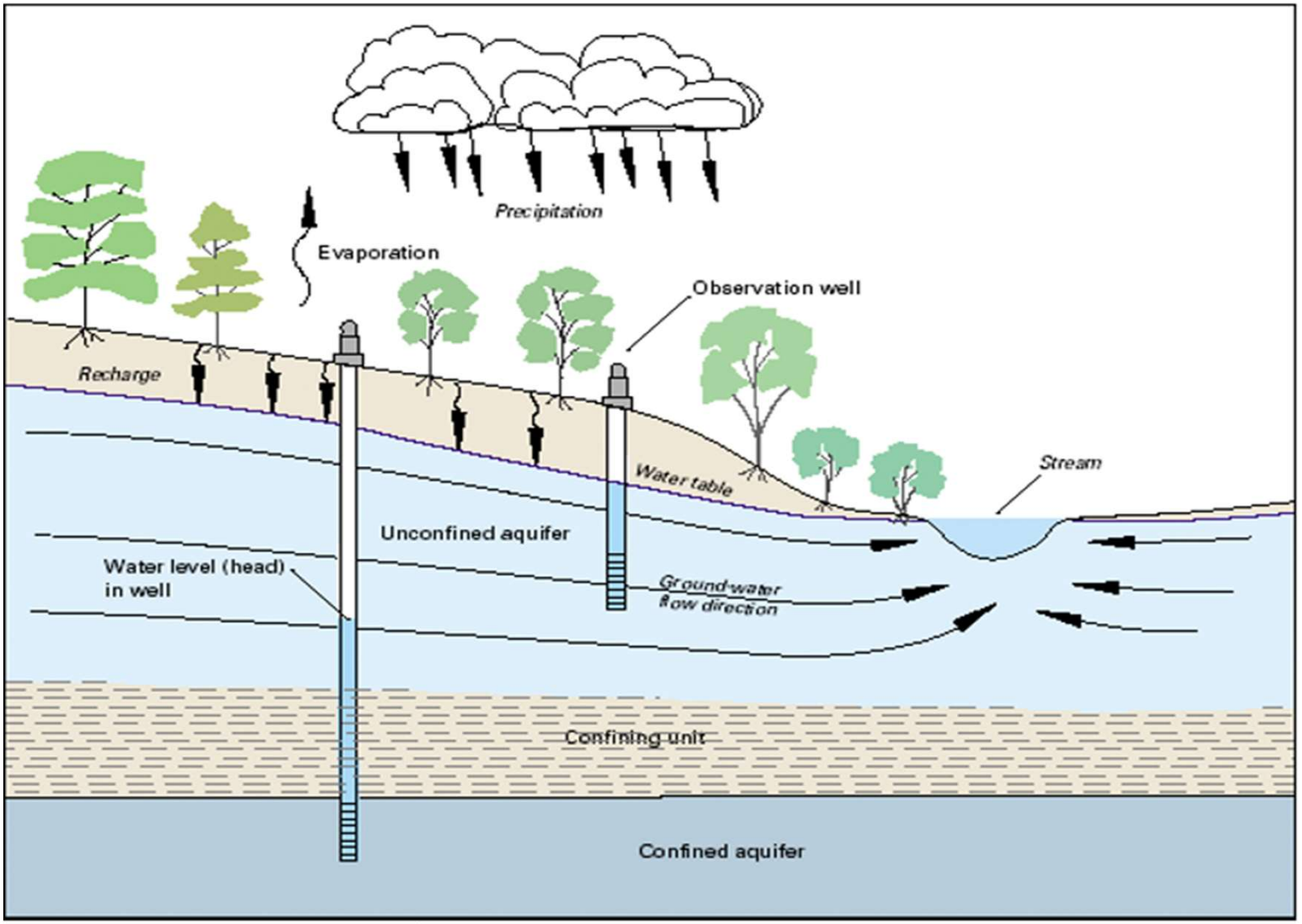
Water Cycle


Groundwater and land use in the water cycle
Direction of groundwater movement
Human induced impacts on groundwater
Natural processes
Precipitation
Evaporation
Transpiration
Runoff
Soil erosion
Municipal sewage treatment plant
River
Crop dusting
Manure spreading
Irrigation
Runoff
Infiltration
Construction erosion
Road salt
Sanitary landfill
Hazardous waste
Underground storage tank
Septic system
Livestock waste storage pit
Zone of aeration
Water table
Zone of saturation
Municipal well
Private well
Sand & gravel aquifer
Lake
Wetland
Tailings pile
Slurry tank
Leachate
Abandoned mine shaft
Creviced limestone aquifer
Porous sandstone aquifer
Direction of groundwater movement
Artwork by JimMcElvoy

Surface Water



Groundwater



Source: USGS Water Science Photo Gallery

DNR Activities

- Monitor and evaluate surface waters
- Develop standards
- Drinking water and wastewater plan review
- Permit water withdrawal and wastewater discharge
- Drinking water and wastewater monitoring
- Collect, review and manage data
- Compliance inspections
- Technical/regulatory support
- Monitor invasive species and permit aquatic plant management

Water Quality Issues

- Contaminants
  - Lead
  - Nitrate
  - Bacteria, viruses and other pathogens
  - Arsenic
  - Radionuclides
  - Other Inorganic & Organic Compounds
  - Emerging Contaminants

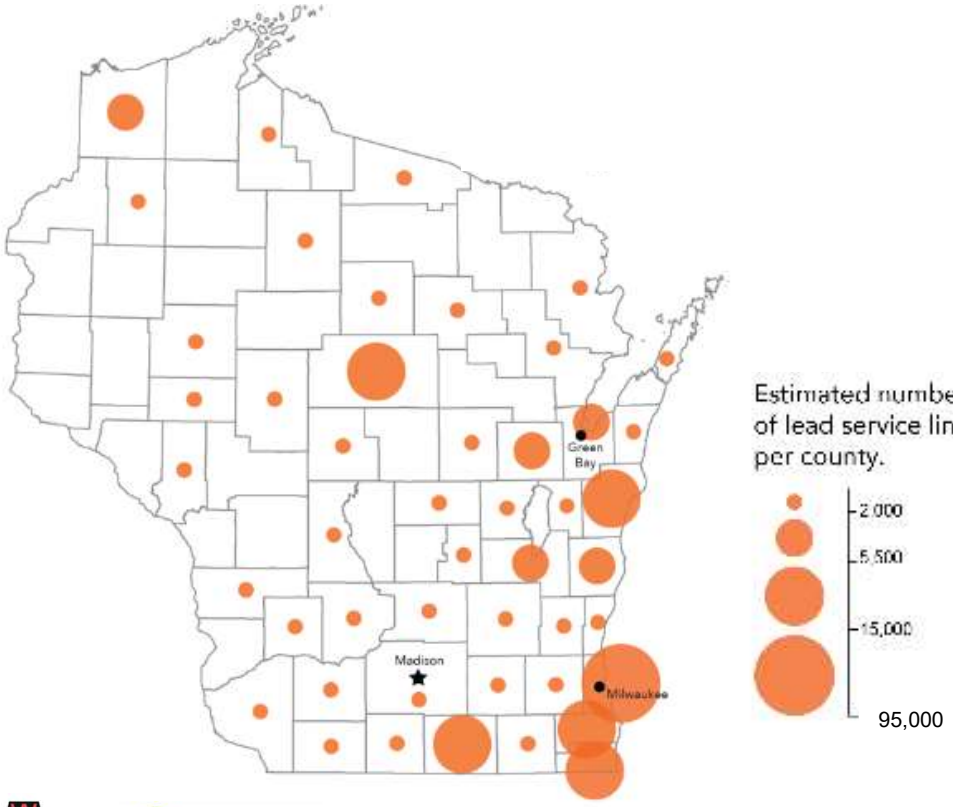
Water Quality Issues

- Effect of groundwater withdrawals on water quality
- Nutrient loading
  - Stormwater runoff
  - Direct discharges
- Harmful algal blooms
- Aquatic Invasive Species
- Contaminated river and lake sediments
- Aging public water/wastewater facilities infrastructure

Lead in Drinking Water

Estimated Number of Lead Service Lines (LSLs)

- **130** systems with LSLs
- **207,5000** total utility-owned LSLs
- **$344 million** - **$1.23 billion** to replace them all



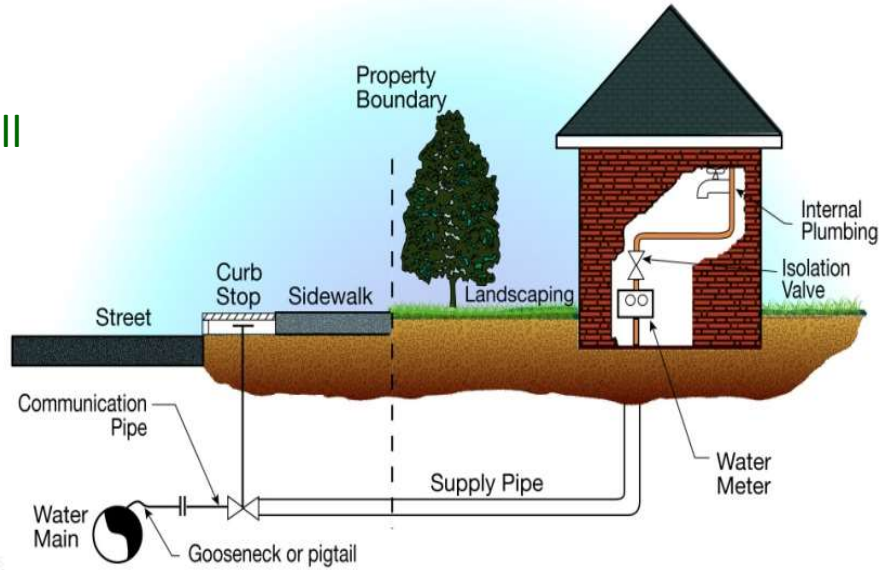


Image source: WI Center for Investigative Journalism

RECOMMENDATIONS

- Provide additional funds to water utilities specifically for LSL replacements beyond what is currently available in the federal safe drinking water loan program.

- Provide funding for lead removal in schools and daycares to supplement the new U.S. EPA grant program funding for lead testing.

- Leverage the safe drinking water loan program to provide increased capacity for funding of all project types, including LSL replacements.

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DEPT. OF NATURAL RESOURCES

Nitrate in Groundwater

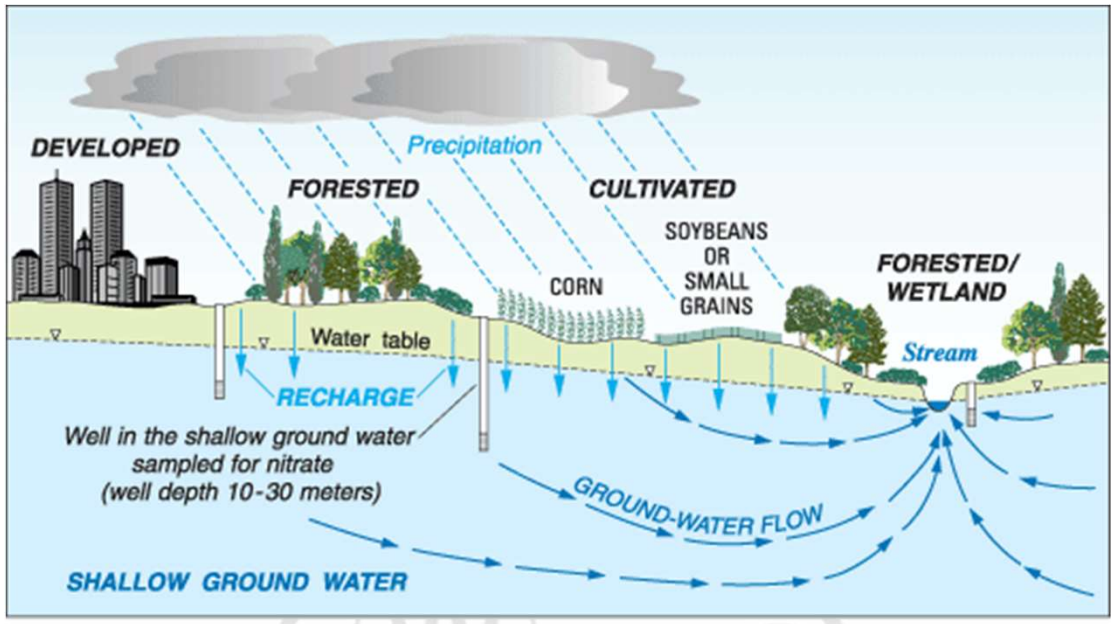
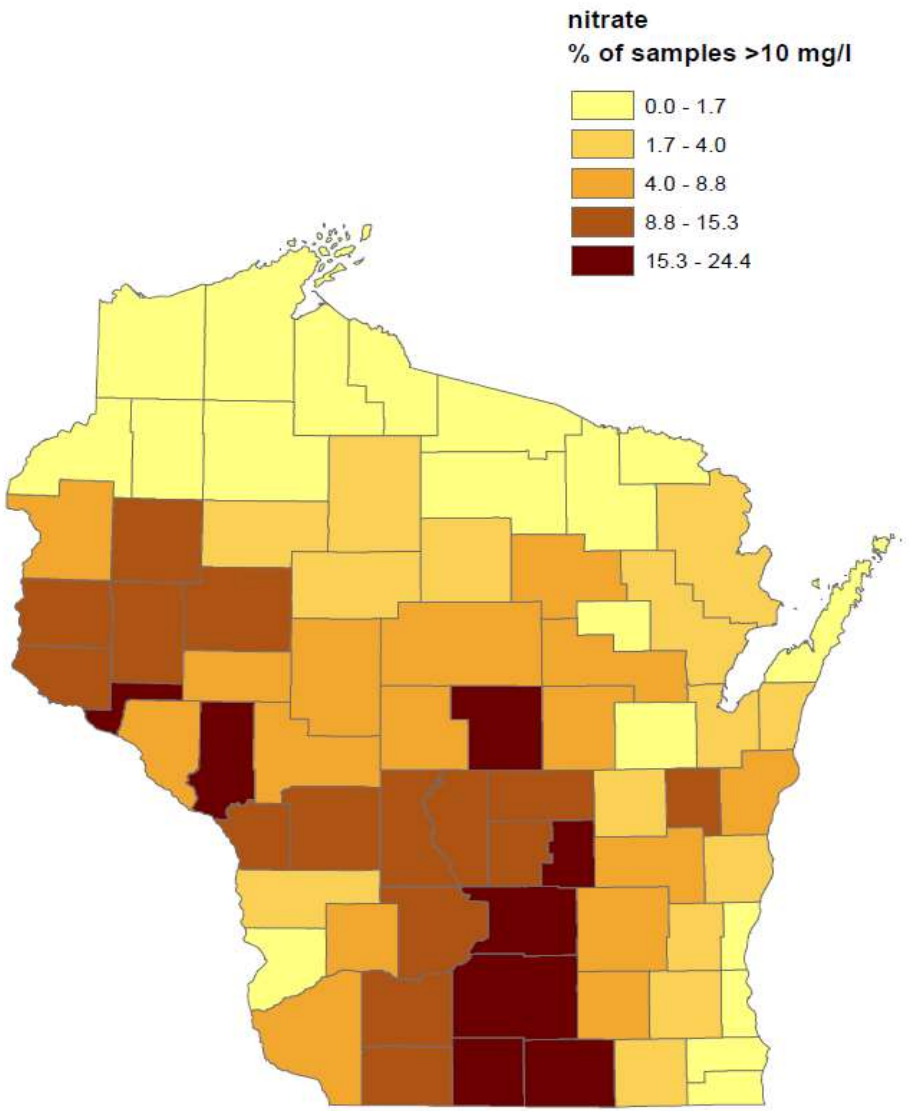


Figure 1. Typical locations of wells in the shallow ground water of the Mid-Atlantic Region sampled for nitrate.

Percent of Private Wells over Nitrate Standard



Current Status

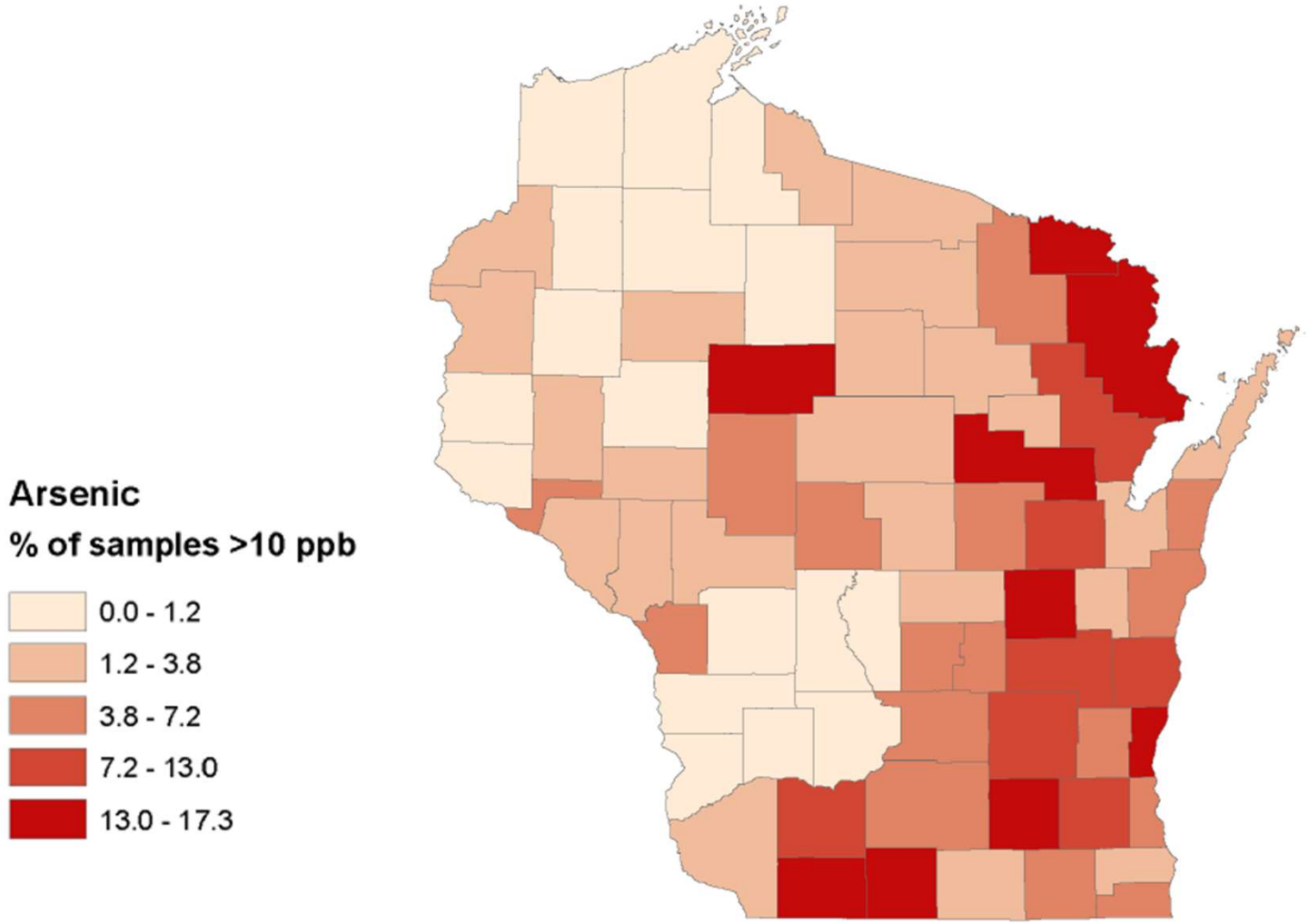
- An estimated 42,000 private wells exceed nitrate level of 10 mg/L. The estimated cost to replace these wells so they have nitrates below 10 mg/L is approximately $446 million.

- Approximately 300 small public water systems currently exceed nitrate standard and about 30 additional public water systems exceed each year.

Recommendations

- Identify sensitive areas based on geology and soils where nitrate is present in groundwater
- Modify well compensation program to allow for funding private well replacement for low-income well owners where nitrates exceed 10 mg/L
- Implement nitrate initiative pilot recommendations, including developing a nitrate fertilizer decision support tool for nutrient management protective of groundwater quality

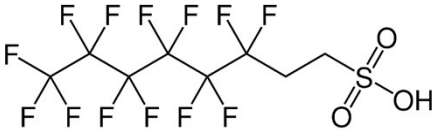
Percent of Private Wells over Arsenic Standard



Emerging Contaminants

- Per- and polyfluoroalkyl substances (PFAS)
- Pharmaceuticals, personal care products (PPCPs)
- Legionella
- Strontium
- Next generation pesticides and herbicides

Per- and poly- Fluorinated Alkylated Substances (PFAS)



Current Status

Example of How PFAS Moves Through the Environment

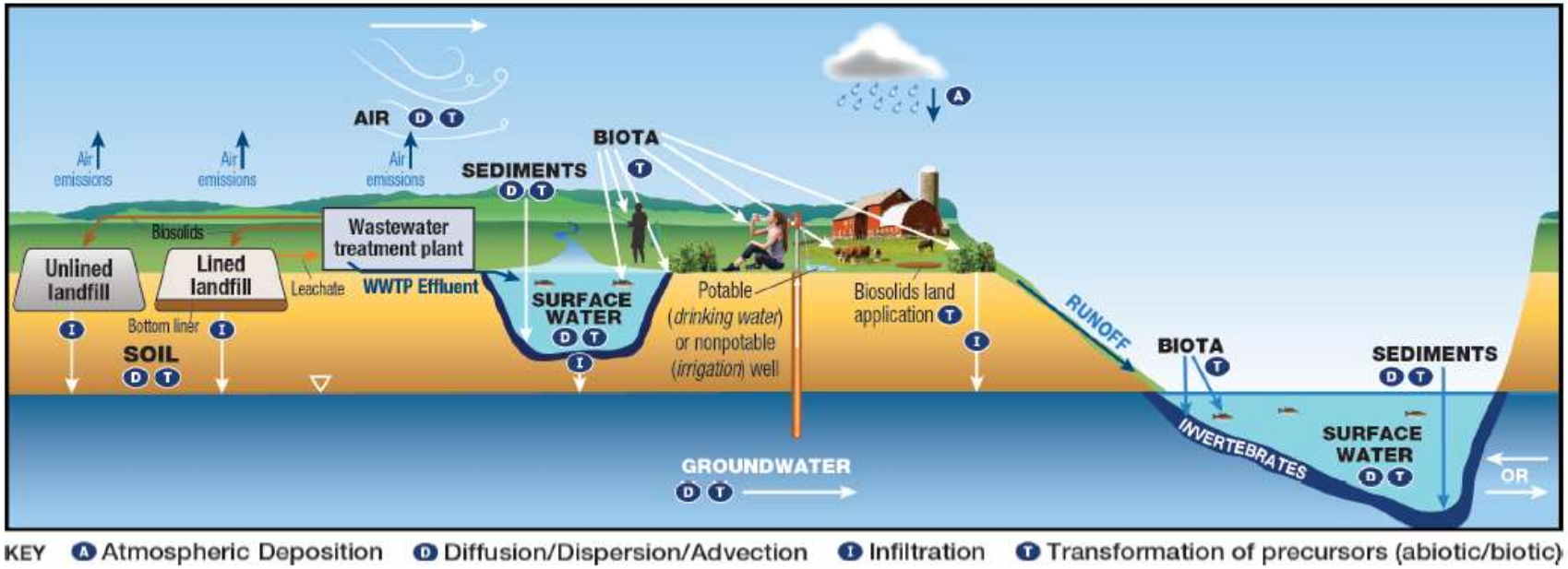


Figure 3. Conceptual site model for landfills and WWTPs.

(Source: Adapted from figure by L. Trozzolo, TRC, used with permission)

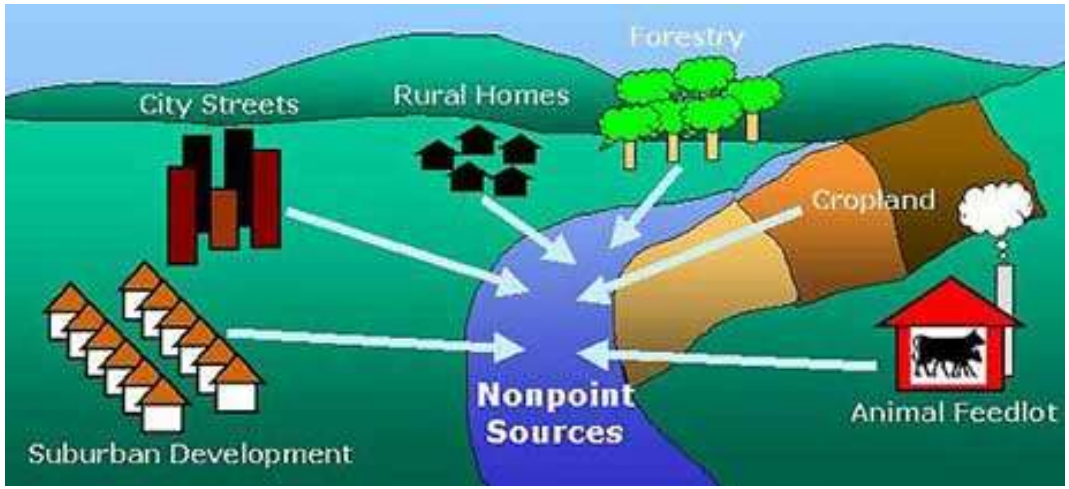
Environmental impacts

Conceptual site model for how PFAS may enter the environment from one source (firefighting foam applications).
Source: ITRC

Recommendations

- Research staff and funding
  - develop a model to identify and prioritize PFAS contamination sites
  - conduct fire-fighting foam survey and develop best management practices
- Establish multi-media clean-up standards
- Evaluate what other states are doing to identify PFAS sources, impacted citizens and the environment

Nonpoint Pollution



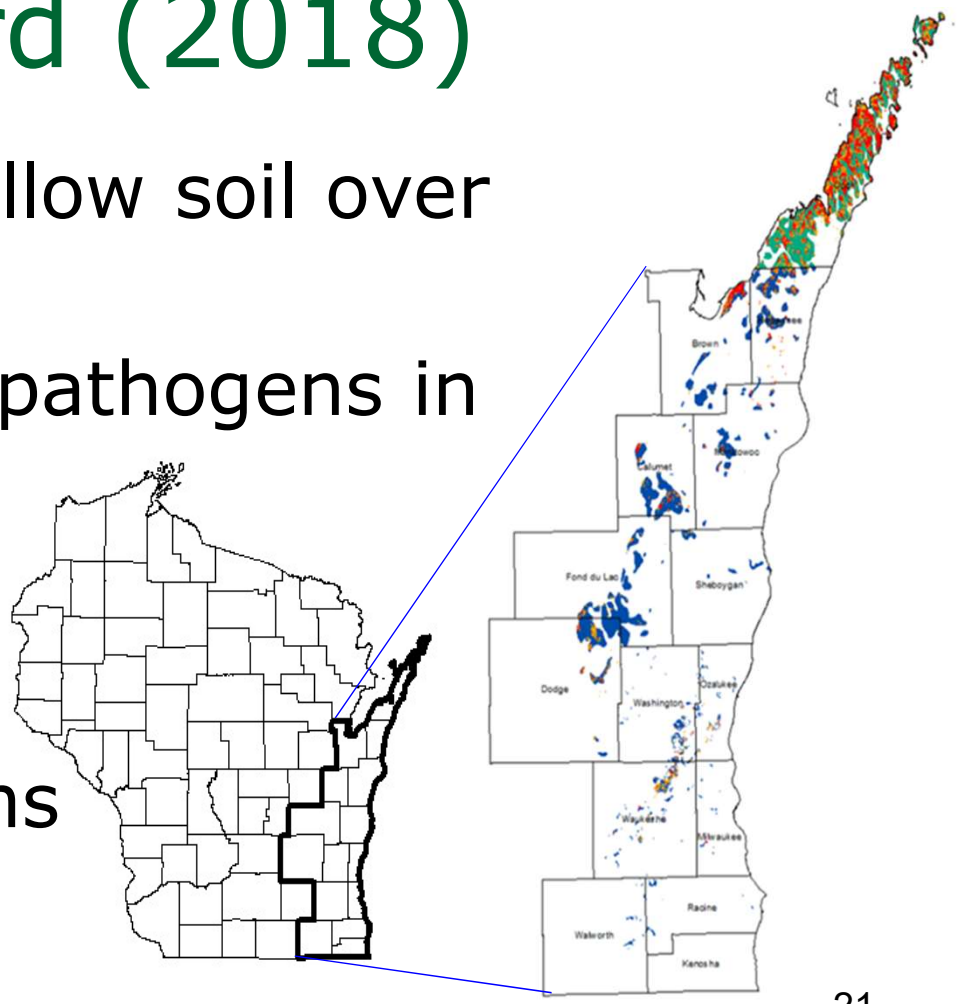
Source: NOAA

Background

- Urban and agricultural storm water carries sediment and other pollutants across cities or fields into waterways.
- Statewide practices and prohibitions are established to reduce pollutants.
- If the statewide standards are insufficient for a sensitive area, then targeted standards are developed.

Targeted Performance Standard (2018)

- 16 counties with shallow soil over Silurian bedrock
- Goal: reduce risk of pathogens in groundwater
- Setbacks and restrictions are applicable to all farms

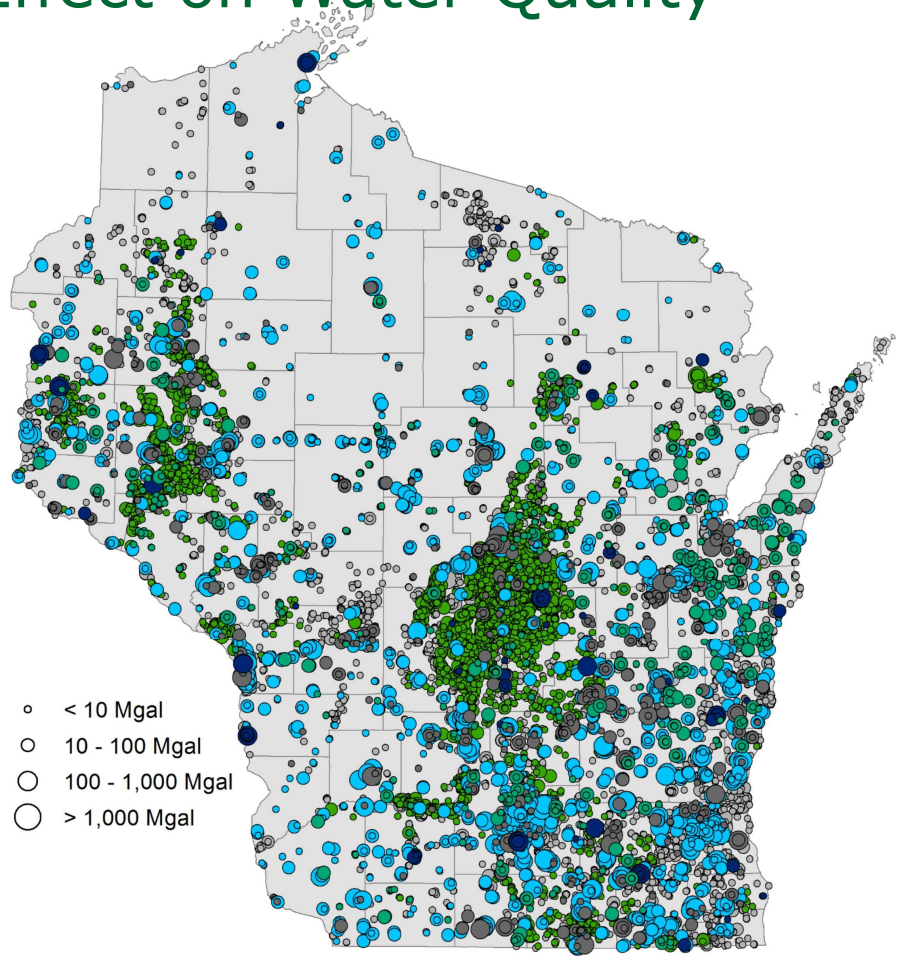


Recommendations

- Fully implement statewide and targeted performance standards and prohibitions (via NR 151).
- Consider additional targeted performance standards.
- Expand partnerships with DATCP, county governments, and municipalities on outreach efforts and develop innovative practices.

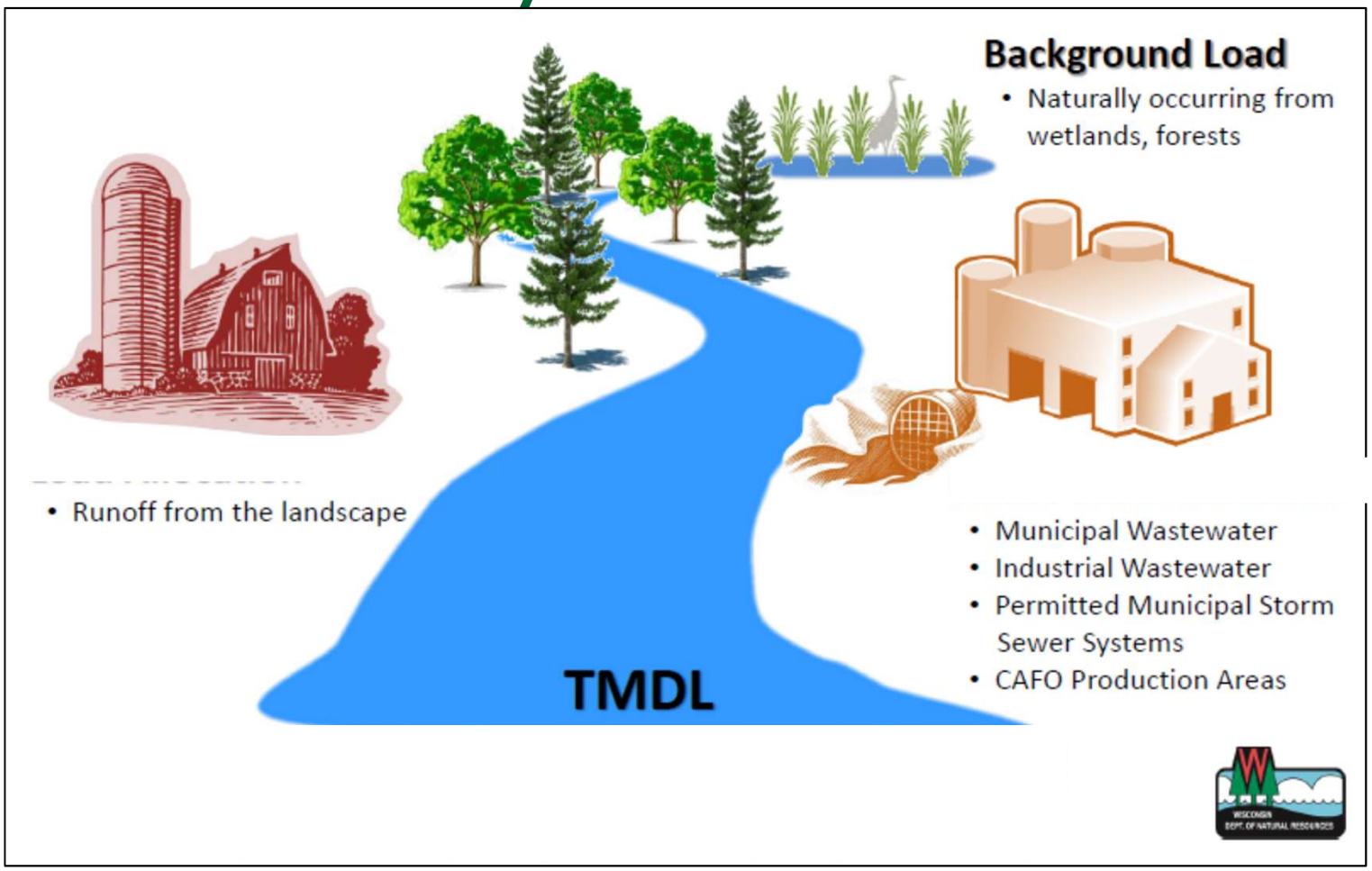
Groundwater Withdrawals

Effect on Water Quality



Nutrient Pollution

Nutrient loading comes from a variety of sources.



Harmful Algal Blooms (HABs)

More frequent extreme precipitation, warmer water temperatures, and longer ice-free growing seasons promote algae growth in Wisconsin.

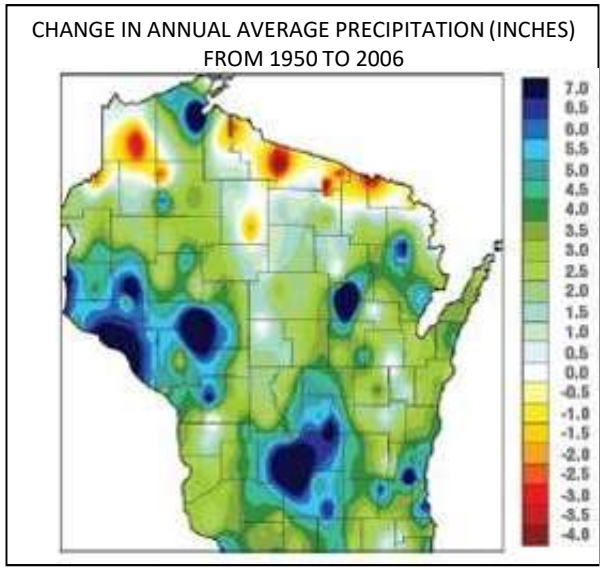
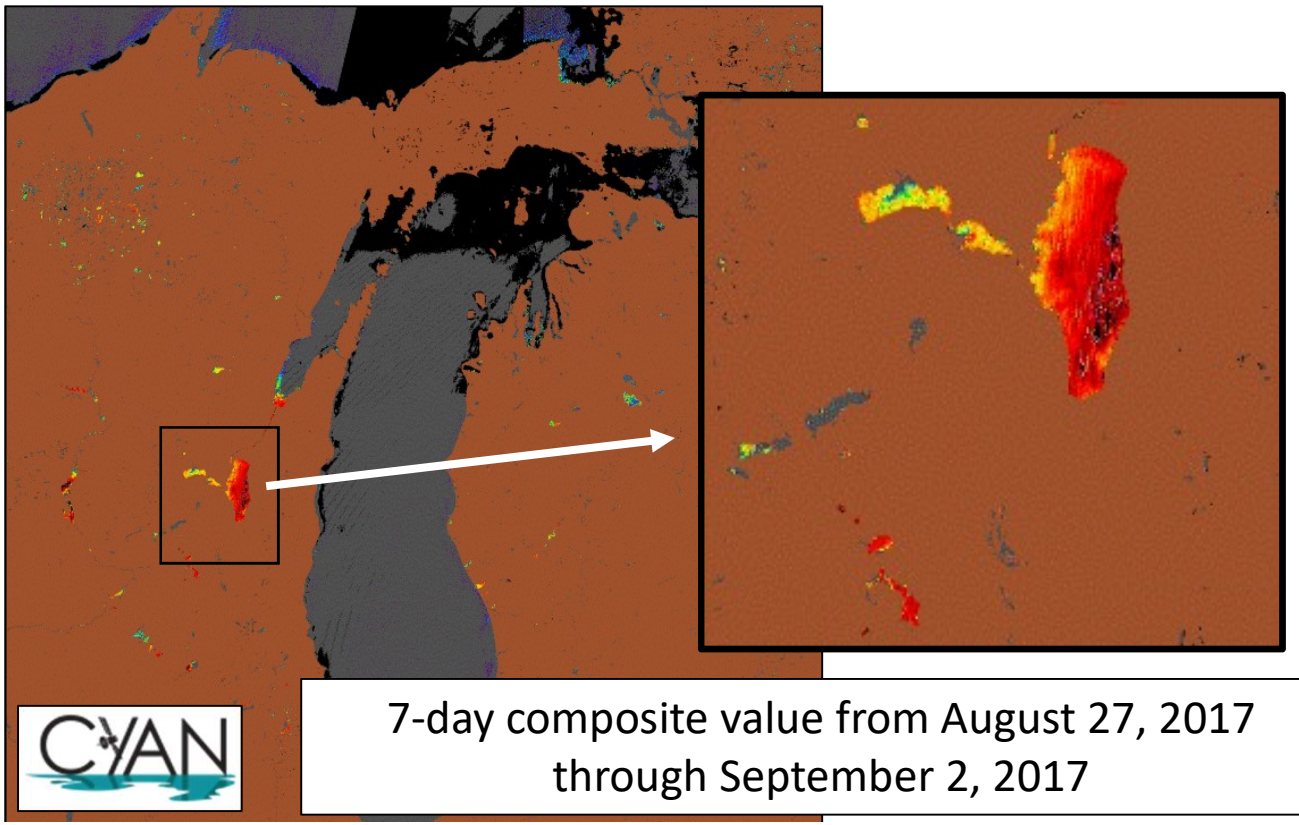


Figure from Wisconsin Initiative on Climate Change Impacts 2011: *Wisconsin's Changing Climate: Impacts and Adaptations*
https://www.wicci.wisc.edu/publications.php

Current Status

Extent of HAB frequency and toxin production in Wisconsin is unknown. Remote sensing can track HABs in large lakes.

Red colors indicate high densities of cyanobacteria.



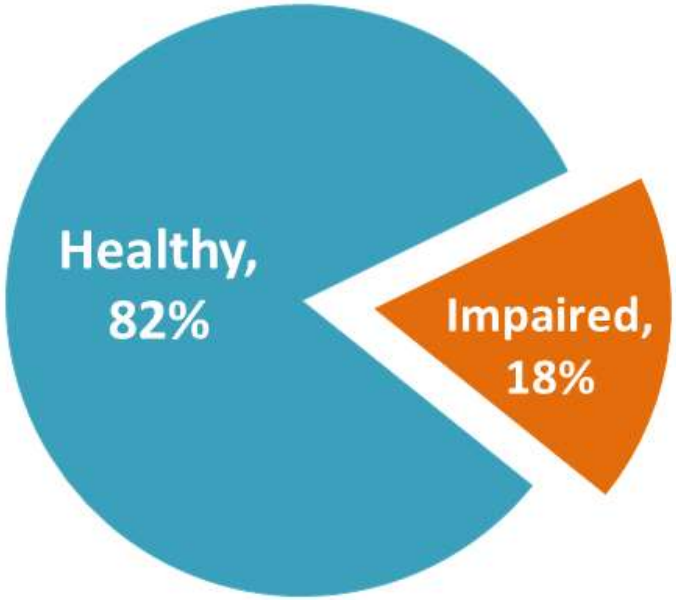
7-day composite value from August 27, 2017 through September 2, 2017

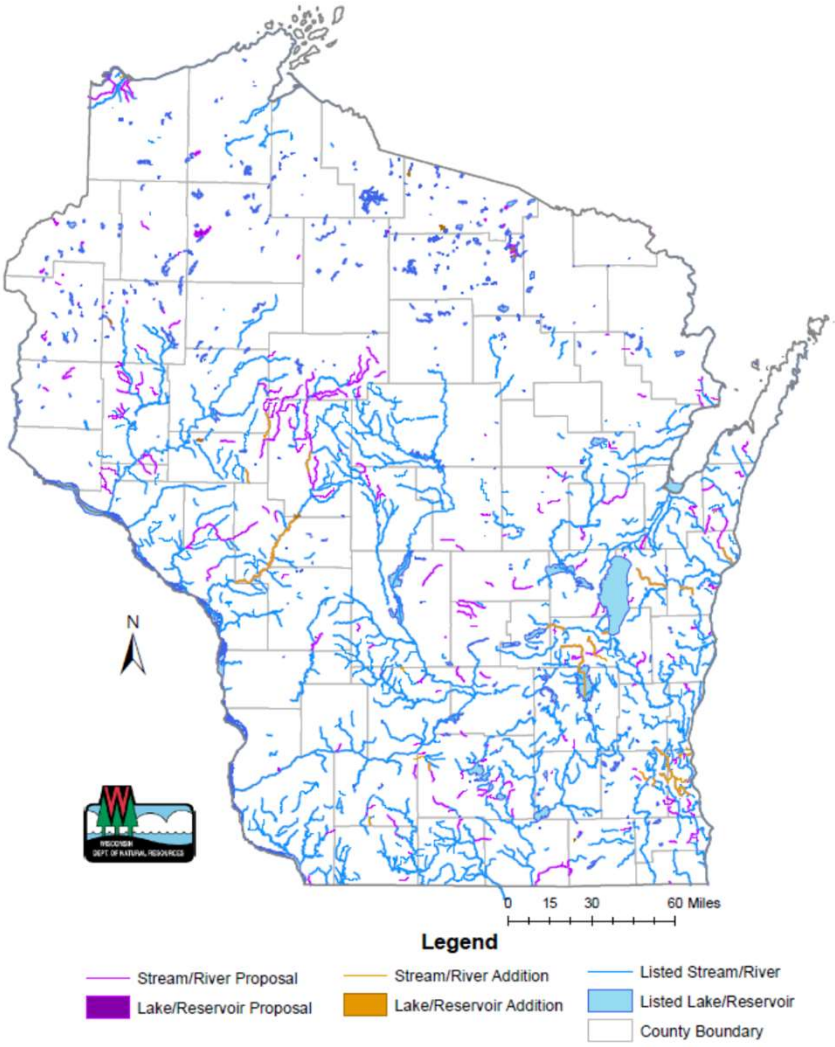
Hypoxia (Dead Zones)

from "**A Science Strategy to Support Management Decisions Related to Hypoxia in the Northern Gulf of Mexico and Excess Nutrients in the Mississippi River Basin" USGS 2004**

Green Bay Hypoxia

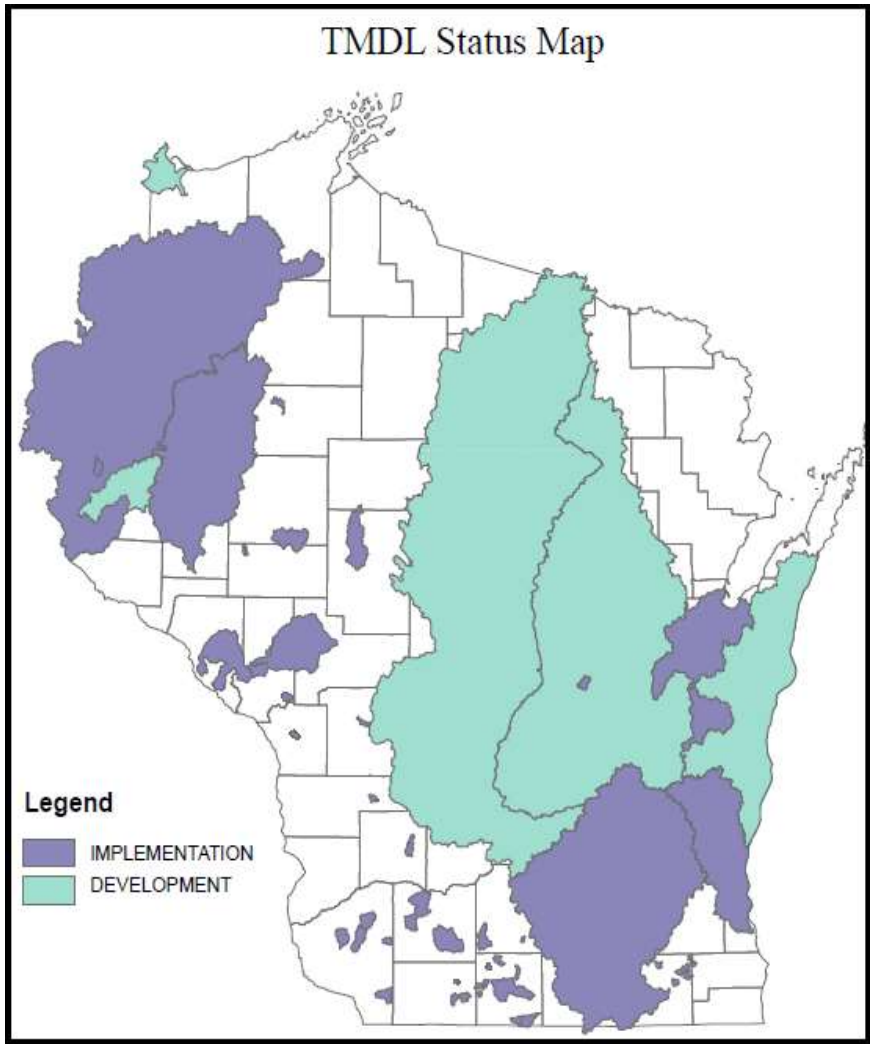
Wisconsin's Impaired Waters





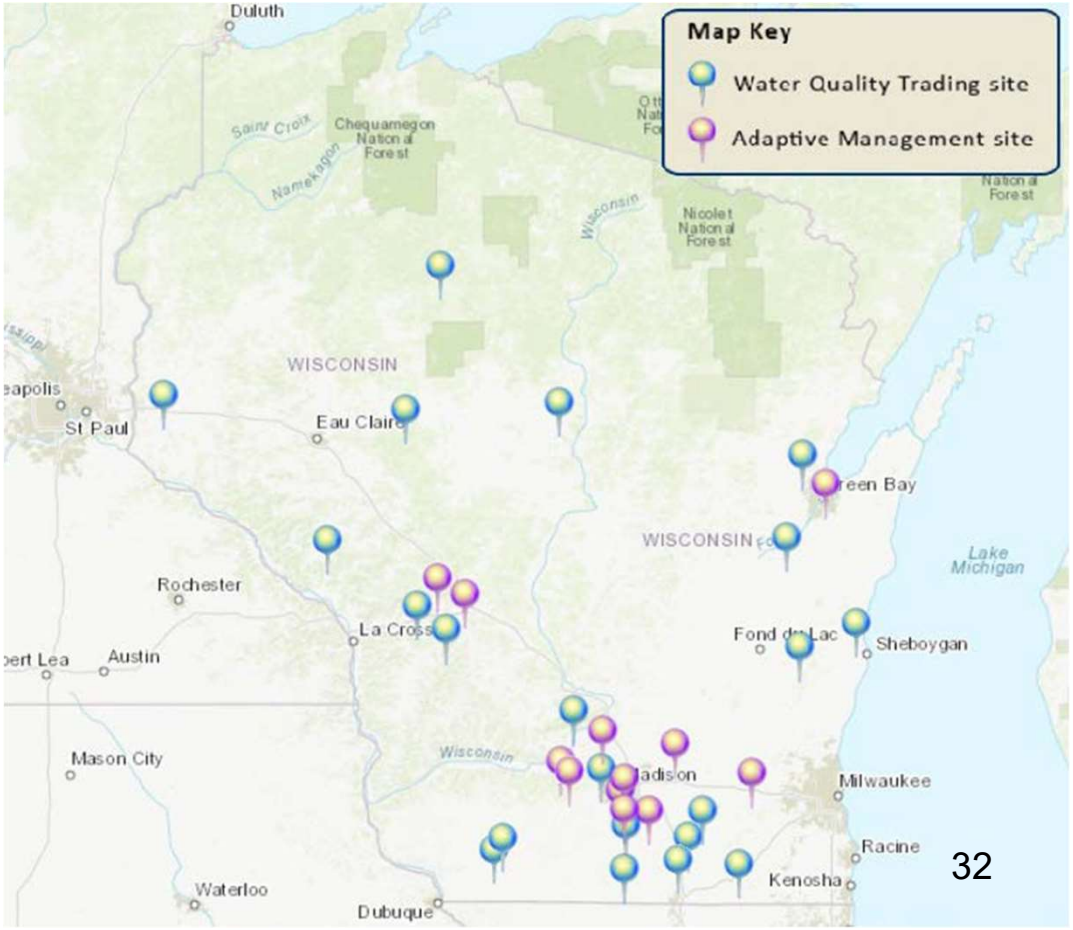
Total Maximum Daily Load (TMDL)

- Clean Water Act required
- State water quality standards set the goal
- Protect public health, recreation, aquatic life
- TMDL is the pollution "budget" for both point sources and non-point sources

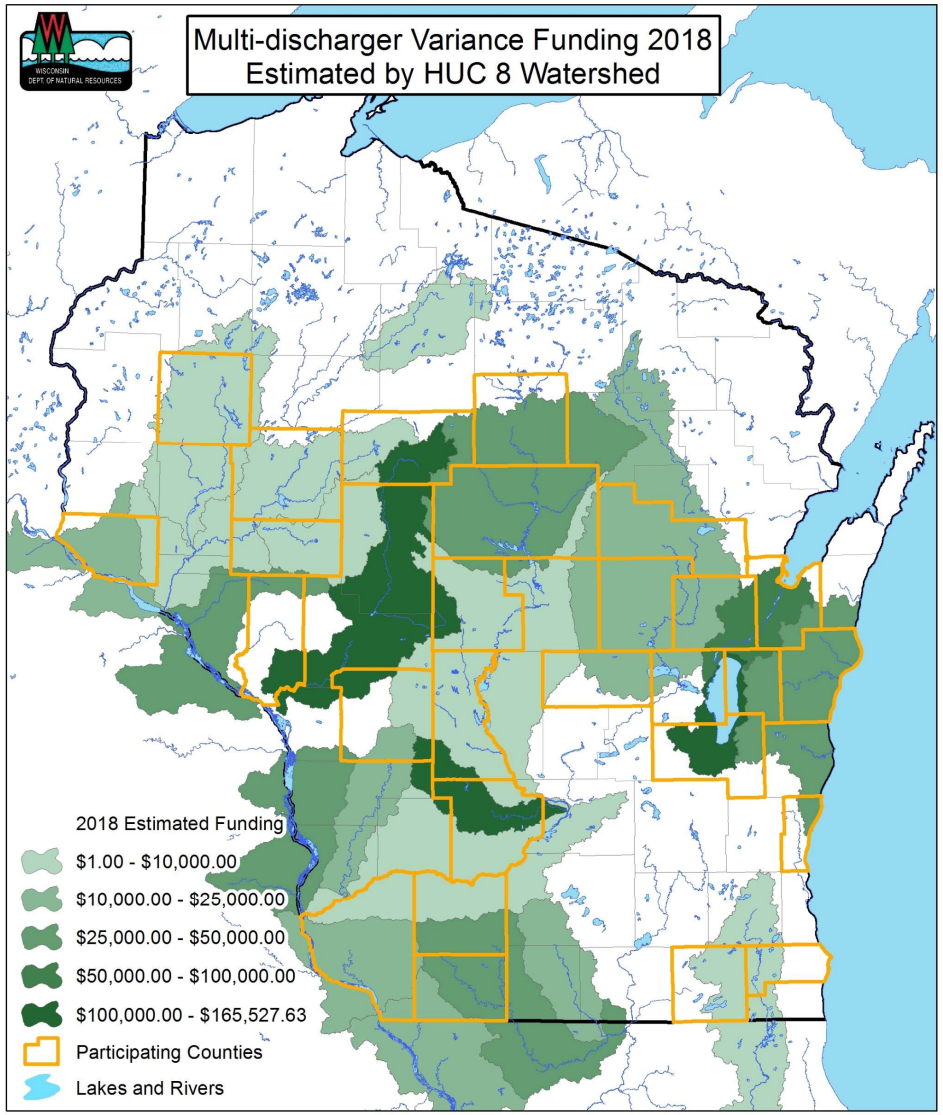


Options for Wastewater Permit Holders to Comply with Phosphorus Limits

- Locations Statewide
  - Adaptive Management
  - Water Quality Trading



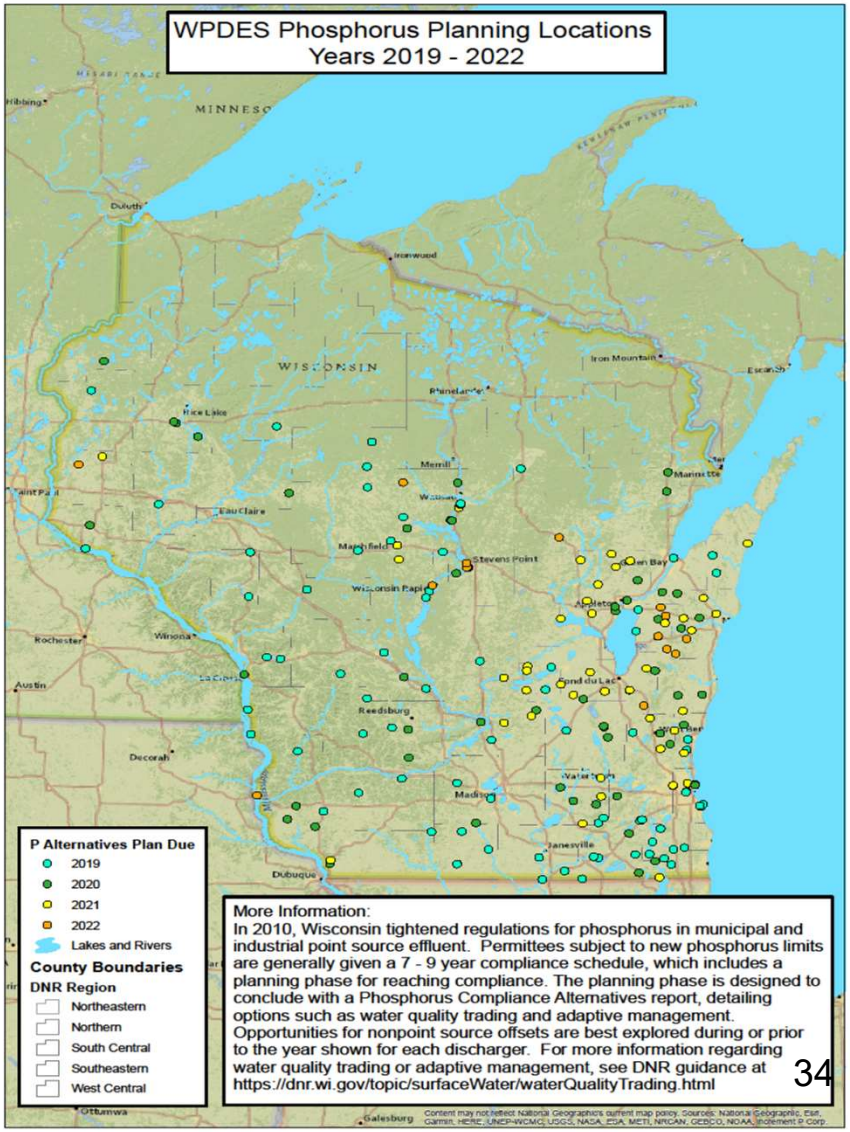
Multiple Discharger Variance (MDV)



Recommendations

- Funding for planning, outreach, and implementation

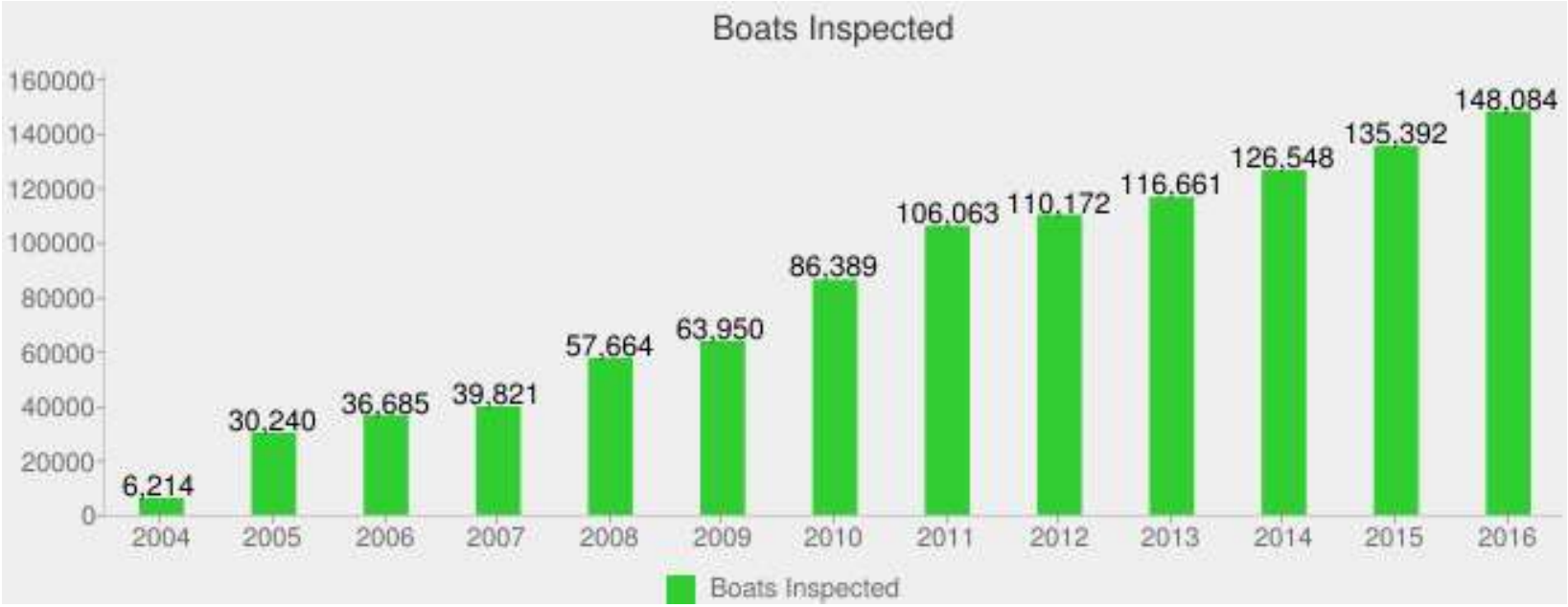
- Each point on the map represents a WPDES facility investigating phosphorus compliance options



Aquatic Invasive Species

Clean Boats, Clean Waters

Clean Boats, Clean Waters includes teams of volunteers, as well as some paid staff from the DNR, Sea Grant and other organizations. Boat inspectors help perform boat and trailer checks, disseminate informational brochures and educate boaters on how to prevent the spread of aquatic invasive species.



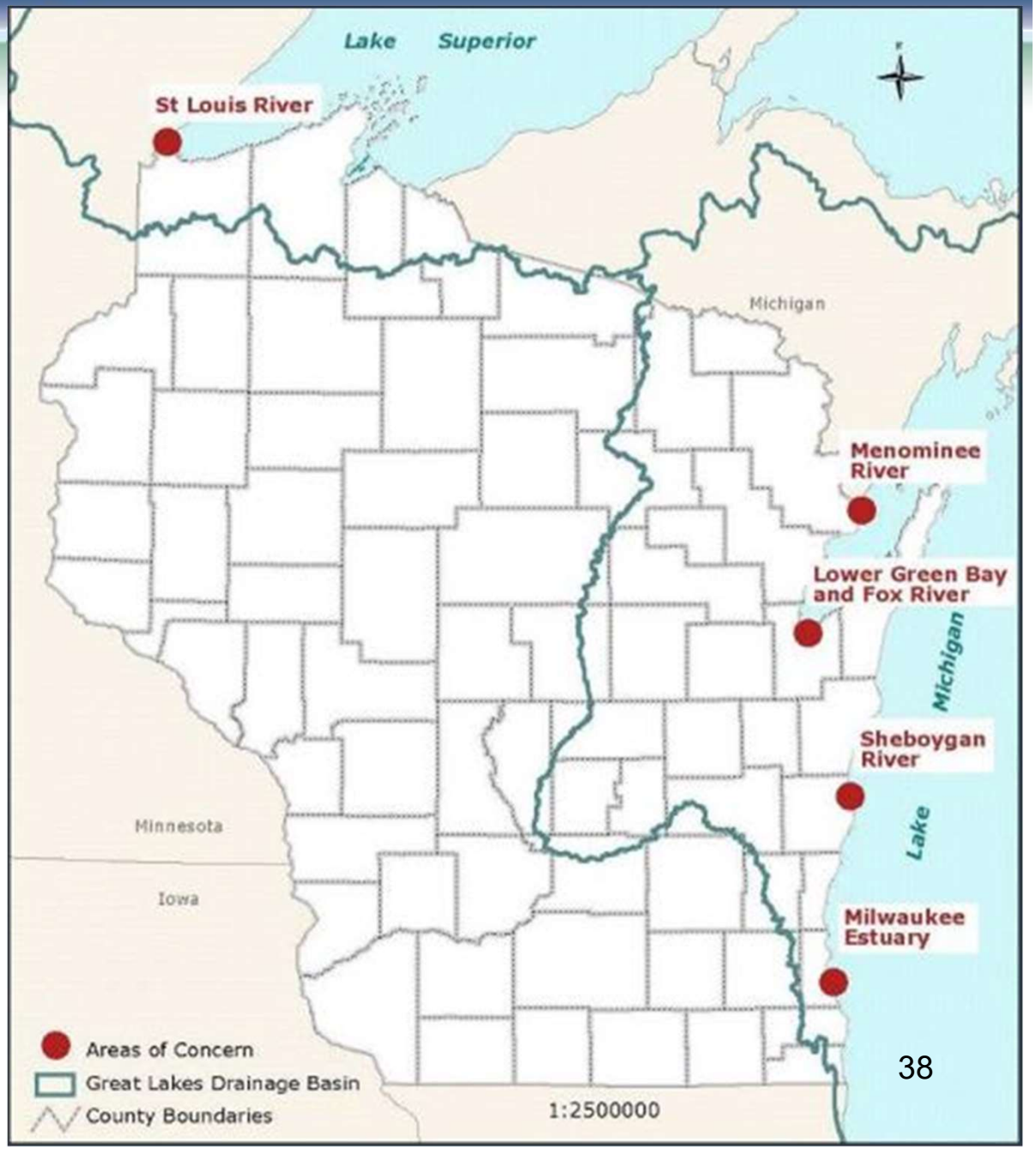
Contaminated Sediments

- Legacy sediment contamination.
  - Old problem needing new solutions

- Environmental clean-up & economic recovery.

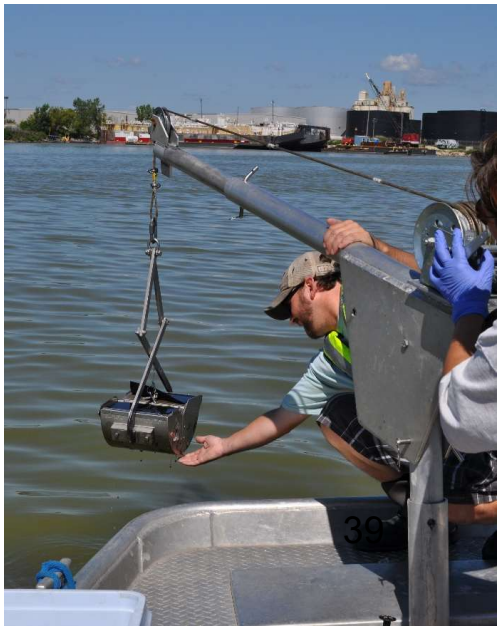
EPA Great Lakes Areas of Concern in Wisconsin

1. Milwaukee Estuary
2. Sheboygan River
3. Lower Green Bay & Fox River
4. Lower Menominee River (shared with MI)
5. St. Louis River (shared with MN)



Current Status

- $27 million in state-bond leveraged $153 million in cost-share from federal Great Lakes Restoration Initiative (GLRI) and others.
- Sediment bonding to continue making legacy contaminated sediment clean-ups.



Recommendations

- Partnering on legacy contaminated sediment clean-ups.
- Leverage state sediment bonding, local, and other non-federal funds with EPA GLRI Legacy Act funds.



Aging Infrastructure

Community Financial Assistance Grant Programs

1. Well Compensation
2. Well Abandonment
3. Urban Nonpoint Source & Stormwater Management
4. Municipal Flood Control
5. Targeted Runoff Management
6. Surface Water